



Severely
With the Author's kind
regards

THE

ANTECEDENTS OF CANCER.

BY

CHARLES H. MOORE, F.R.C.S.,

SURGEON TO THE MIDDLESEX HOSPITAL;
AND TO THE ARTISTS' BENEVOLENT FUND.

LONDON:

T. RICHARDS, 37, GREAT QUEEN STREET.

MDCCCLXV.

P R E F A C E.

It is to be hoped that the study of Cancer will be prosecuted on a larger scale than heretofore, and in a new direction. Much has been already ascertained, and doubtless yet more will be discovered, with regard to its nature when once established in the body ; and for such inquiries the opportunities are ample. From the extent of the mortality and the average duration of the disease, I calculate that there cannot be fewer than 30,000 persons suffering from Cancer in England and Wales ; and, while patients are but too abundant, special establishments for their reception and relief are being multiplied. Our old endowed department of the Middlesex Hospital is no longer the only institution for Cancer. The towns in the provinces have begun to set apart wards for such cases. At St. Petersburg, the Empress of all the Russias is at this moment engaged in erecting a special hospital for this malady, which is planned to accommodate 150 patients. Besides benefiting a people among whom Cancer seems to be unusually rife, her munificence will confer on her intelligent medical officers vast opportunities of extending our

knowledge and improving the treatment of the disease.

But that which now even more demands attention than the pursuit of Cancer through its stages of increase and decay, is the antecedent condition to which it is due. There are fewer facilities for the detection of this than might be expected in public institutions, where no intimate preliminary acquaintance with the applicants can be had, and where aid is too rarely sought, even at the beginning of the disease. Misled by the trifling inconvenience which it then usually occasions, or deterred by dread of an operation, or of disreputation from the avowal of such an ailment, patients fail to bring it to the cognisance of their medical attendant in its incipient stage. The opportunity of early investigation, as well as the advantage of prompt treatment, is thus missed. Yet somewhere, among the personal, social, industrial, traumatic, or geographical conditions of the patient, in the *débris* of foregoing disease, or in his ancestral entail, the cause of Cancer surely lies within reach of an adequate search. May it not be that reflection on the part of our elder Associates—practitioners who have been sole attendants of families for years before the appearance of Cancer among them—should bring to light some further facts bearing on this inquiry?

We need to know, amongst other things, these chiefly :

a. The nature of the cases returned as Cancer. Of this there is probably little doubt at the time of death.

b. The fact of its unequal distribution in the community. This should include returns from districts which have little Cancer, as well as from those which have much.

c. Differences in the form and usual duration of the disease, and in its primary site, which vary, as I have reason to think, in different parts of the country.

d. The concurrent morbid productions of the places where Cancer is rife, and the alternative diseases, or those prevalent where it is rare.

e. The general condition of the people who are the more liable to Cancer, and of those among whom it is infrequent.

f. The individual characteristics of the person affected with Cancer: his place in his mother's family; his vigour as compared with that of his brothers and sisters; his previous state of health or disease; the usual and the fatal ailments of other members of his family; and any further facts which might seem to bear upon the origination of the disease.

g. Is it too much to hope that, amid such reflection, circumstances capable of repetition might be recalled to mind, in which a temporary or a permanent arrest of the disease could be traced to some definite cause?

The greater part of the following argument

—a mere essay in so great an inquiry—was presented to the British Medical Association at their last annual meeting at Leamington. It was designedly made brief, and chiefly suggestive, being prepared, at the request of the Committee of Council, for the purpose of introducing a discussion on the subject, “Are there any Antecedent Conditions influencing the Production of Cancer?” It is a part of the result of the study of this disease to which I am bound by my office in the Middlesex Hospital. In some degree it is a return to the profession of their own labours, which are compiled in the volumes of the Registrar-General; and it has been furnished forth with contributions, which I gladly and gratefully acknowledge, from Kendal, by Mr. Noble; from Newcastle-on-Tyne, by Dr. William Murray; from Derby, by Mr. Curgenven; from Leicester, by Mr. Benfield; from Exeter, by Mr. Kempe; from Plymouth, by Mr. Eccles; and from Dr. Stewart, Mr. De Morgan, Mr. Nunn, and others of my friends and colleagues, both medical and surgical, at the Middlesex Hospital.

C. H. M.

102, Piccadilly, September 1865.

CONTENTS.

Definition of the Disease	1
Question of Antecedent Conditions	3
Resemblance to Typhoid	3
Previous Disease in the Blood.....	4
Source in Tubercle or Syphilis	4
Coincidence with Rheumatism.....	5
Preparation in Organs not Cancerous	5
Constitutional Origin.....	6
Examination of this Theory.....	7
As to Final Wide Dispersion of the Disease ...	8
Multiple Primary Tumours	9
Affinity for Various Textures	11
Local Recurrence after Operations	11
Growth Internally after Extirpation of Primary Tumour.....	14
Repetition in Families (Hereditary Na- ture)	15
<i>a.</i> Resemblances of the Disease in Direct Descent	16
<i>b.</i> Dissimilarity in Indirect Descent ...	19
Most frequently not Inherited	21
Rarity in Infancy and Youth (Numerical Statement)	22
Not Transmitted to Fœtus by Cancerous Mother	24
Inherited chiefly as Local Disease.....	24
Relation of Cancer to Tubercle	25

<u>Cancer Originates as a Local Disease</u>	26
At first a Single Tumour	27
Primary Tumour the source of the Later.....	27
When traceable from Parentage, mostly a Local Disease	27
Occurrence in Healthiest Persons	27
Local Excitation of Cancer	27
By changes in the Tissues of the Adult	28
Through Primordial Imperfection of Structure	28
Generally Good Health before the occurrence of Cancer	29
No Common Prior Ailment	29
Aspect Healthy at the beginning of the Disease...	30
Normal Condition of Principal Organs	31
Natural State of Structures adjoining Tumours...	31
Longevity of the Parents of Cancerous Persons ...	32
Cancer most common in Elder Children	32
Place of Cancer Patient in Mother's Family. (Table)	35
Occurrence of Cancer in Large Families. (Table)	35
Distribution of Cancer in the Community	36
Cancer abundant in Certain Families	36
Families exempt from Cancer	37
Prevalence of Cancer in Nations.....	37
Number of Cancer Deaths in England, 1850—62. (Table)	38
Increase of the Disease	39
Distribution of Cancer in England.....	41
Proportion of Cancer to Population and to Mor- tality, by Divisions, 1851 and 1861. (Table)	41
Unequal Prevalence of Cancer in Divisions	42
Cancer Deaths of Female Adults by Divisions, 1851—60. (Table)	43
Cancer of Women very unequal	44
Comparison of South-Eastern and North- Western Divisions, as to Healthiness	46
— As to Liability to Cancer at all Ages. (Table)	47

CONTENTS.

ix

Towns contrasted in respect to Cancer. (Table)	48
Conclusion: Cancer originates in the Healthy ...	49
Theoretical explanation of the Fact	49
Cancer a late production of Embryonic Ma-	
terials.....	50
Disorderly and uncontrolled in its Growth ...	51
Result of surviving Embryonic Power in	
Tissue	51
Peculiar to the wane of Organic Life.....	52
Argument for Early Operations in Cancer	53

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ARE THERE ANY ANTECEDENT CONDITIONS
INFLUENCING THE PRODUCTION
OF CANCER?

*Reprinted, with additions, from the "British Medical
Journal", August 26th, 1865.*

THE CONDITIONS PRECEDING CANCER.

BEFORE presenting my contribution in reply to the question I have the honour to introduce to you, I will endeavour to give a brief definition of what we may agree to include in the term Cancer. Such a definition is necessary, chiefly for the purpose of precisely limiting the conditions and the period of time to which our inquiry should extend.

It is a disease originating in a single spot as one tumour or new growth. In that spot it mixes with the natural tissues, which are destroyed in it, and never reproduced. Its component microscopic cells having a greater power of multiplication than those which it displaces, but less of vital stability, the tumour is liable to early degeneration, ulceration, and gangrene. Its elementary parts are capable of filtering or being shed into the adjoining healthy tissues, and they may thus be dispersed over a very wide area; they may also be conveyed to parts remote from their place of origin, travelling with the circulation, or sinking by gravitation in the liquids of a serous cavity. Afterwards, when attached in a new site,

they manifest a power of growing, as they might have done where they first sprang. In each new place, they thus give rise to a separate tumour similar to the first. The disease, so far as we know, is common to men of all nations, all times, and all parts of the world; and it is not limited to the human species, being met with also in the domestic animals, both herbivorous and carnivorous.

These qualities and characteristics are not all possessed by every example of the disease; and, happily, the most virulent are the most rare. It is in some cases limited to the part in which it first arose; whilst in others, not apparently dissimilar, it becomes widely dispersed. Every degree of malignancy in this respect is, in fact, observable in different cases; from that which remains for twenty years a local, albeit an advancing disease, to that which is diffused all over the body in as many weeks. The solid growth which slowly creeps over the face, and is followed so closely by ulceration that the substantial disease of the margin rarely exceeds the thickness of an old penny-piece—that growth misnamed an ulcer, which scoops such hideous caverns in the human visage—is no less a Cancer than the occult tumour which forms in the male or female mamma, and which, when “open”, as we term it, has a like ulcer with only a thicker edge. The capacity for diffusion may be possessed by all Cancers, though not that of growing when diffused. The Rodent Cancer, and some of the mammary, may yield up to the absorbents no more of their substance than a fatty

tumour, the elements of which, when taken into the circulation, display no power of reproduction in the next place they come to occupy. As Cancer, they may never pass out of the vicinity of the original tumour, or reach beyond the glands; yet, in the peculiarities of their local progress and in their common hostility to every indigenous texture, they are equally Cancers with those which can spread to distant regions and luxuriate in dissimilar organs, and which possess sufficient vitality to grow after transplantation, not only from one organ to another, but from one to another animal. It is to Cancer thus broadly defined that the chief remarks which I venture to submit to you apply.

“Are there any Antecedent Conditions influencing the Production of Cancer?” Our question relates to that which precedes what has been defined as the commencement of the disease—precedes, that is to say, its first appearance in the form of a tumour. Is it possible to discover any anterior condition which can be assigned as the cause of this earliest local outbreak of Cancer? The question is one passing all description in the importance of its bearing upon the treatment of the disease.

Now, I must at once avow that I am not in a position to demonstrate any such anterior occasion of the disease. Excepting local irritation, no prior cause is known from direct observation.

Rokitansky has drawn attention to the resemblance between the acutest forms of Cancer and the

effects of typhoid fever on the intestines. The two diseases have, indeed, some likeness in the microscopic cell-growth which occurs in them, and in their invasion of the adjoining lymphatic glands; but I need not say that the resemblance does not show their identity, and that there is no probable similarity in their causes. It has been argued, that there must be a preliminary fault in the blood; but chemistry and the microscope have alike failed to show any, even after the disease has begun; and the arguments on which that theory rests (too lengthy here to dispute) are, I think, in collision with facts. Were Cancer in the blood before its deposition in the tissues, it should be far less subject than it is to the local influences of the part in which it breaks out. The extirpation of the first tumour should in no way affect the progress of the disease in other parts. And further, acute diseases affecting the blood should also have an appreciable effect upon it. I have searched for such effects, endeavouring to discover if Cancer were arrested, and its local tumours subsided, during acute diseases which alter the condition of the blood. It has never happened to me, however, to see continued fever in a patient suffering from Cancer; and I have, consequently, been unable to study its effects on a cancerous tumour.

In looking round upon other known diseases as probable sources whence Cancer may spring, we cannot but regard Tubercle and Syphilis as having a suspicious alliance to it, from their manifest similarity in several pathological and clinical points. But sus-

picion is disarmed in the case of Syphilis by the observation of Cancer where Syphilis does not occur—namely, among the lower animals. And the concurrence of Phthisis and Cancer in the same persons or the same families is not more frequent than the fearful prevalence of the former disease among us may explain. After the discussion on the question treated of in this paper, the President of the Association, Dr. Jeaffreson, drew my attention to a frequent and marked coincidence of Cancer and Rheumatism in the same persons, which he had observed. Dr. Fenwick has begun an investigation into the origin of Cancer by a microscopic and chemical examination of those blood-making organs which are not involved in the fatal cancerous disease, and in which, therefore, any changes tending to a preparation of materials for the morbid growth might be detected. In a paper communicated to the Royal Medical and Chirurgical Society during its last session, he reported that a majority of fifty-seven cases, of which he had procured specimens from the Middlesex Hospital, had afforded him proofs of both physiological and chemical defects in the gastric and intestinal mucous membrane. Whether these followed or preceded the outbreak of the disease, he was unable to assert, as the cases had, of course, proved fatal before the changes in question came under his eye. It would be premature to pronounce upon the value of such an investigation. Though promising, it has thus far shed no light on the first period and cause of the disease. The same remark applies to all other

modes of conducting the inquiry. Only after the malady has already declared itself can the search for its cause be undertaken, and it can be directed only to antecedent facts of which we can then take cognisance; for the disease always creeps forth insidiously, and we may not institute examinations of apparently healthy people with a view to its possible development in them.

Setting aside for the moment merely mechanical irritation, as inadequate of itself to determine the growth of Cancer, I suppose that all our present conceptions of the efficient cause of this disease are embraced in the idea of its constitutional nature.

However broad or however partial the idea we form, whether we connect it with the blood, or with the system as a whole, or with one offending organ, that, in some degree or other, is our explanation of the origin of Cancer. It is probably pictured in our minds as an innate or an acquired misdirection of natural growth; and that not as a consequence of some fault resident in the structures showing the disease, but as enforced upon them by a concealed control on the part of the general system.

It is an antecedent constitutionalism, ensuring the production of a local tumour, possibly in some elected spot; but, if that most appropriate for its development be wanting, or have been removed, then in some less disposed structure; still, however, and always, under the constraint of a general necessity somewhere and somehow to deposit the characteristic material. The constitutional influence may be itself

disease, or the accumulated and overflowing product of a still anterior disease; this matters not to our idea, the essential point in which is, that the causation of Cancer is not solely in the part where its first independent tumour springs.

Perhaps no opinion bearing on the pathology and surgery of Cancer more needs investigation than this. It is an opinion which stops inquiry, anything constitutional looking so like an ultimate fact. If it be incorrect, it diverts attention to wrong and profitless channels; to the state of the blood; to previous or concurrent ailments of the patient; to peculiarities in the habits or construction of himself or of some of his ancestors. It seriously vitiates practice; inducing hesitancy and delay in operating during the early and really hopeful period of the disease. It is an opinion, moreover, which goes far to pervert even our perception of facts; leading some surgeons to dissociate from Cancer, the presumed constitutional malady, certain other diseases which are obviously cancerous, solely because they are usually devoid of this conjectural antecedent malignant element. It would be impossible to obtain a satisfactory reply to the question before us, without examining the foundation on which the theory of the early constitutional nature of Cancer rests.

The grounds on which Cancer is held to be originally of constitutional nature are, I apprehend—

1. Its final universal diffusion throughout the body.
2. Its occasional commencement in many primary tumours simultaneously.

3. Its capacity to grow in various textures.
4. Its local recurrence after an operation on the primary tumour.
5. Its appearance in internal organs notwithstanding the extirpation of the primary tumour.
6. Its repetition in families (hereditary nature).
7. Its relation to Tubercle.

1. The opinion that Cancer is constitutional is not an unjust one, if it be restricted to the final and widely spread condition of the disease; for nothing can be more nearly universal than the dispersion of tumours through the body sometimes is, or more plainly tainted and infected than the organs through which they are scattered.

But if this conclusion, which expresses the result of the disease, be reflected back upon its earlier nature, and an inference be drawn that, as it is finally constitutional, it must have been so from the beginning, more is asserted than the multiplicity of tumours proves. Common as it is in the end to many regions and to diverse structures, Cancer is not proved to be constitutional in the sense of each several tumour having originated directly and apart from all the rest in some prior general cause. For, in the observation of many cases, the sequence in growth of tumour from tumour is to a great extent demonstrable, which sequence, as it explains the successive appearance of tumours by continuity and vascular connection, supersedes the necessity of referring them to any other cause. We thus trace back the disease to a period at which but one tumour existed; and we

come upon cases in which one tumour alone constitutes the total and final disease.

It follows from this that, if multiplicity of tumours in the later stage of Cancer does not prove their common derivation from the constitution, one chief reason for regarding the original tumour as constitutional is taken away. On the theory which attributes Cancer to a prior universal disease, the first tumour is but one of many which will be certainly evolved from their common cause, whether that first remain in the body or be removed from it. But, if the later tumours are all traceable, directly or indirectly, to the first, the origin of that one can only be referred to the constitution on grounds which are altogether independent of any subsequent progress of the disease.

2. An argument for the constitutional nature of Cancer is drawn from its occasional outburst in multiple primary tumours. If it do thus originate in many parts at the same time, its dependence on the constitution would not be worth contesting. For a common tendency of the whole body to the disease is much the same as a liability of many of its separate parts. The removal of a tumour from one part could not then hinder, as it does, the production of the disease in other parts; and surgical operations would be useless, offering neither a prospect of delay in the development of the coming tumours, nor hope of a permanent exemption from them. In fact, however, these cases of simultaneous multiple Cancer rest only on traditional authority. They are not met

with under the more exact observation of the present day. The most rapid outbreaks of the disease are as orderly as the most chronic; and the appearance of a contemporaneous origin of many tumours is due to the rank growth of medullary Cancer, and to the rapidity with which its soft materials are conveyed to all parts with the circulation.

A doubt as to the usual sequence being preserved in the formation of the tumours cannot reasonably be entertained when it has been distinguished in another equally rapid case. Such a case came under my care ten years ago at the Middlesex Hospital. A well-grown and womanly looking girl of fourteen years of age noticed some soreness at the fissure of the palm near the ring finger of the left hand. In a week there was a small nodule there of the size of a pea, and situated under the skin. Four days subsequently the lymphatics inflamed, the skin along their course was temporarily marked with red lines, and a tumour as large as a hazel-nut was noticed in the middle and inner part of the upper arm. This was slightly painful, and was hard. A swelling as large as a pea next formed four inches higher up, near the axilla, which rapidly grew to the size of a large nut, diminished, and then increased again. The tumour in the hand was opened, but no matter flowed. All this had happened in one month, when the girl came under my care. In three weeks more the palmar tumour increased greatly in size, and was partly soft, partly firm and nodular. The tumours in the arm increased, and a slight tender lump appeared in the

neck, near the left angle of the jaw. In the succeeding week, the eighth of the disease, three days of unexpected inflammation yet more increased the tumour in the hand, which sloughed on its surface, and presented the everted edge of Cancer at the open parts. At the same time a new tumour formed above the wrist, near the ulnar nerve. Eventually tumours formed in the skull, and the upper parts of the body, and she died in about half a year from the outbreak of the disease. The orderly appearance of the tumours in this rapid case was as clear as in any which have a more chronic course, and their derivation from that which first grew in the hand was equally demonstrated.

3. Its capacity to grow in various textures furnishes another reason for attributing Cancer to the constitution. Distant tumours in the same body are alike, and their manifest unity demands that they should be referred to a single source. What source so natural as the constitution, which, at any rate, can be assumed to be one, whilst the organs occupied by the tumours are so dissimilar? But the production of multiple tumours is as conceivable out of the travelled elements of the first tumour, as it is out of a cause so indefinite and imperceptible as the constitution; and we are not compelled to adopt the constitutional theory, if a mechanical distribution of living elements from the first tumour suffices to explain the origin of the later growths.

4. An influential argument for the constitutional nature of Cancer, is derived from the results of sur-

gical operations for the removal of the primary tumour. Either, as in the majority of cases, the disease re-appears in the wound, or in the neighbourhood of the scar; or, without any recurrence in its first site, a tumour of the same nature grows up in the subordinate lymphatic glands. Again, it returns neither in the region it first occupied, nor in its lymphatics, but in some internal organ of the body, and then pursues its course as if the original tumour had never existed; or, once more, by one of the rarest successes in operative surgery, the entire disease is finally extirpated. It is cut out, and it never returns.

Now, it is impossible to call in question such imposing and practical evidence for the constitutional nature of Cancer as is afforded by its recurrence after operation, without seeming to impugn the practice of Surgery. For, on the hypothesis of the primarily local character of the disease, its return after operation proves it to have been but partially removed. But, although Cancer be thus local, yet a recurrence of it will take place without fault in the Surgeon. Of many cases, it is enough to explain that the exigencies of practice demand incomplete operations; and that they must be done, not unwittingly, but deliberately, for the sake of advantages far short of a complete extirpation of the disease. With regard to the remaining cases, the alternative of a constitutional or a local origin of Cancer must be decided by an examination of all the facts. If the disease do not return in the site of the operation, the possibility

of finally extirpating it, at least from a part, and, therefore, its independence on the constitution when once locally deposited, are established, whatever be the constitutional influence under which it is assumed to have originated. And if, after such complete local eradication, Cancer nevertheless show itself in an internal organ, the local character of the original tumour is the more confirmed, since this conjectural constitutional influence, which is alleged to be ample to produce secondary internal disease, is powerless to resuscitate that of the region first selected for its growth. But, if operation avail in one case for the extirpation of the primary disease, its failure in another case, or even in many other cases, proves, not the constitutional nature of the malady in those instances, but the incompleteness of the operation. And, indeed, it cannot be doubted that, notwithstanding the utmost circumspection, inappreciably minute fragments or prolific elements of the disease are sometimes left in the wound at the time of the operation; and that others may exist which are beyond detection, in the glands, in an internal organ, or in transition from one part of the system to another. And, further, some operations are done with more regard to neatness in the scar than to the free removal of suspected parts. So long as it can be reasonably doubted whether the whole of the morbid structures existing at the time were removed, no light whatever is thrown on the nature of the disease by any number of disastrous recurrences after such operations. Recurrence is inevitable,

*Is this a
primary
cancer?
determining
its first
position*

with disrepute, which is shared in unfair proportions between the operator and the disease.

Could any circumstances have been more likely than others to confirm, by the results of surgical operations, the constitutional nature of primary Cancer, they would have been those of a family well known at the Middlesex Hospital, of which six female members had that disease in the same organ, the left breast. What more hopeless, apparently, than operations in persons in whom constitutionalism seemed so pronounced? Yet, two sisters in this house passed eleven and twelve years respectively after the removal of the breast without recurrence of the disease; and, upon its return at those dates, and a repetition of the operation, each remained healthy for seven years more. No further recurrence of the disease is yet known to have taken place in these persons.

5. Notwithstanding its complete and final extirpation from the part first attacked, Cancer sometimes eventually appears in internal organs. Is it not there an independent disease, and a product of a morbid tendency common to the whole body? In the present state of our knowledge, I cannot think this a proof of the constitutional origin of the disease. For it is not shown that the internal disease originated of itself subsequently to the removal of the primary tumour. Unless that be proved, the appearance of secondary Cancer in the internal parts, or indeed in any distant region, can equally be referred to dissemination from the primary disease, as

when that is not operated on, or when it has been but partially removed. Even a considerable delay in the growing of the secondary tumours, does not show that they were not initiated by materials which had travelled from the original disease; for I have known six years to elapse from the removal of a cancerous breast to the time of troublesome growing of the disease in an unsuspected gland behind the pectoral, and twelve years in one of the cases just referred to before the local recurrence of Cancer of a breast removed by Mr. Arnott.

6. The opinion long prevailed in the profession, and still more out of it, that Cancer is hereditary. The facts, however, on which the opinion is founded, do but partly support it. Still less do they prove that, in its transmission by inheritance, Cancer passes as a constitutional disease.

For first it is to be noticed that, while the disease is traceable in more than one member of a family once at most in six times, yet five times out of the six it is not to be found in any of the relatives of the affected person. Even the rule of inheritance is, therefore, far from being established. And next, although the disease may occur in two or more persons who are related to one another, the circumstances attending its repetition in a family vary much, and consequently bear with unequal importance upon the argument for the constitutional nature of the disease. It will be convenient, and, I think, accordant with facts, to separate and study in two classes, the few examples of multiple Cancer occurring in families.

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Leprosy
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a. The fact is a very imposing one, when two, when three, even four, or six members of one family connexion are known to be cancerous. It is, indeed, impossible to question the reality of such an occurrence, and consequently to deny to inheritance some influence in the generation of Cancer.

This conclusion is confirmed to some extent by an examination of particular instances of concurrent Cancer in families. It is found that the disease is traceable in a direct descent from parent to child. I saw a case with Mr. Nunn and Mr. McOscar, in which a woman died of Cancer of the mouth, who had recently for a long period attended her father with Cancer of the lip. Mr. Sibley has recorded an instance in which a mother and two daughters were affected with Cancer; another, in which two sisters and the daughter of one of them suffered from it; and a third, in which a mother and five daughters were cancerous. Mr. Paget met with the disease in a grandmother, mother, and daughter; and Dr. Warren, in a note in his book on *Tumours*, refers to six cases of Cancer distributed in three generations of one family.

A yet closer hereditary relationship is to be acknowledged when the disease of the allied members of a family is found in the same organ. This fact was very strikingly pronounced in the three families last referred to. The persons in Mr. Paget's observation were grandmother, mother, and daughter, and the disease in each of them was situated in the uterus. I know of a family in which all the sisters had Cancer

of the breast, while the brothers were free from the disease. Dr. Warren's observation is as follows. In the family of a man who had Cancer of the lip, a son and two daughters had each Cancer of the breast. In the succeeding generation, a daughter of this son and a daughter of one of the daughters had again Cancer of the breast. Dr. Warren added that he suspected other members of this unfortunate family to be suffering from the same disease, but to be carefully concealing the fact. In Mr. Sibley's last example, the mother and five of her daughters had each of them Cancer of the left breast.

Another fact illustrating the inheritance of Cancer is its tendency to repetition in one sex. Out of all proportion to their liability to Cancer above men, it is among women that multiple family Cancers prevail. The occurrence of Cancer in women above its frequency in men is nearly as 5 to 2 ; but in Mr. Sibley's inquiries, it was found traceable among the women of a family nearly eight times as often as among the men. Where a family proclivity to the disease was manifested by its occurrence in more than two related persons, it was found almost only amongst the women. This limitation of repeated family Cancer to one sex tends to withdraw Cancer from its present isolation among diseases, as the peculiarity is one which is shared with it by deformities, and by some remarkable cases in which a progressive fatty degeneration of muscles was absolutely limited to the boys of one family.

It was remarked to me by Mr. Paget that Cancer

appears to increase in intensity with repetition, for it begins at an earlier age in a second generation than in that from which it was derived. The observation corresponds with what has been noticed at the Middlesex Hospital; and it appears to be most distinct when the disease presents itself in the same organ in persons of the same family. Hence, it may happen that a parent and child may be suffering from the disease at the same time. Mr. Nunn had under his care a mother and her daughter suffering together from Cancer of the breast; and Mr. Lawson attended a young man with Cancer of the stomach, whose father was at the same time a patient of Dr. Budd's for similar gastric disease. In a family referred to by Mr. Sibley, a daughter died at 32, and her mother at 52, of Cancer of the uterus. Mr. Paget's observation extended to an additional generation; and the granddaughter died of Cancer of the uterus at an earlier age than the mother, as she in her turn had died of the same disease earlier in life than the grandmother. From Mr. Sibley's report, I find that the remarkable Middlesex Hospital case illustrates the same fact, the five daughters being all attacked at an earlier age than their mother with Cancer of the left breast. And it can be further made out that the malady came on in each successive daughter almost uniformly at an earlier age than in the one next older than herself. It thus appeared to increase in intensity in the children as they were born nearer the time when the disease broke out in the mother; and it happened that the eldest of the five was at-

tacked with Cancer subsequently to its appearance in the second, third, and fourth of her sisters.

These several facts, the occurrence of Cancer in plural members of a family, its direct descent, even through more than two generations, its appearance amongst relations in corresponding organs of the body, and at an earlier age in a child than in his parent, when both are similarly affected, as well as its tendency to repetition in one sex, these facts insuperably prove some effect of parental influence in the production of Cancer. Were they the only facts bearing on the subject, the hereditary nature of that disease might be taken as established. But how rarely do such facts present themselves! The concurrence of them all is not met with once in a hundred times. Can circumstances so rare, or the comparatively less infrequent event of any one of them, be held to decide the hereditary, and therefore the constitutional, nature of the disease, considering how far more numerous are the instances in which it happens to a single member of a family? In some relative, the disease is traceable once in six times; to a parent, it can be referred but once in thirty-eight times: or, to state the same fact conversely, a direct inheritance of the disease from a parent does not happen thrice in a hundred cases.

b. The second class of cases of multiple Cancer in families is, by itself, of no great force in proof of the hereditary nature of the disease; yet it both gives and receives importance when taken together with the first. Affecting more than one member of

the same family, the disease, in cases of this class, presents itself in distant relatives, or in dissimilar organs, or in both. It may thus, in members of several families, attack respectively the lip and the liver, the lip and the mamma, or possibly any other diverse parts. The argument for inheritance is plainly weakened, even when the Cancers are alike, in proportion as the affected persons are distantly connected with one another; that is to say, in proportion to the number of persons intervening in the relationship without presenting the disease. It is further weakened when the Cancers are unlike; and it is entirely altered in its bearing upon inheritance, and therefore on constitutionalism, according to the interpretation which is put upon dissimilarity of the disease in the several affected relatives. If it be usual for dissimilar Cancers to prevail in direct inheritance—for the children of cancerous parents to have primary Cancer of various organs—then Cancer passes from parent to offspring as a general and not a local disease. It belongs indifferently to all the body. Its constitutional nature is established. But if dissimilar Cancers prevail only or chiefly in persons remotely connected to one another, the probability increases that the disease is independent of the relationship. It is certain that near relatives do sometimes have dissimilar Cancers. Perhaps the most convincing example of the fact is one in which two sisters in middle life were attacked with Cancer of the breast; and their father after them, in a ripe old age, had the disease in the humerus.

In Warren's case of Cancer in the breast of both the males and females of two generations, the disease of the grandfather was in the lip. Nevertheless, it may be asserted, though I cannot state the fact numerically, that this multiplication of dissimilar Cancers amongst near relatives is exceptional. Compared with the more striking repetition of similar Cancers in the same household, it is certainly rare. And a connection between them, when they do occur, cannot be established without a satisfactory exclusion of the influence of the other parent (as of the grandmother in Warren's case), through whom, after all, the singular repetition of the disease in one organ of several of the offspring may have been brought about. On the whole, it may be concluded, that distant relatives having similar Cancers, and near relatives with dissimilar Cancers, may possibly owe their common disease to its prior existence in some ancestor; but the evidence is not such as to establish the fact. Relatively to the whole number of cases in the community, the concurrences in question are so infrequent and uncertain as to be more probably due to accidental conditions in the lives of the several persons than consequent on their family alliance.

Such being the principal evidence for the hereditary, and therefore the constitutional, nature of Cancer, what are the arguments against it?

There are circumstances in which the hereditaryness of Cancer may be reasonably doubted, as when it happens in a scar; but perhaps the most obvious objection to the notion is contained in the inquiry, If

Cancer be heritable, what becomes of it? Reversing the information derived from cancerous children in respect to their ancestors, we may assert that, more than ninety-seven in every hundred times, a parent who dies of Cancer has—that is, is known to have—no instance of that disease in his progeny. In the vast majority of cases, Cancer dies out in the affected person, and is lost. And this failure to propagate it cannot be from want of offspring; for the women in families prone to the disease are notoriously prolific. But if it be heritable, in those ninety-seven times it is averted. We may more reasonably conclude that, in this great proportion of cases, it is a personal disease of the parent, and one not capable of transmission.

This conclusion is supported by an examination into the prevalence of the malady at different ages. No period of life being absolutely exempt from Cancer, the influence of inheritance in its production can be tested. Were it inherited, it should be most common while the influence of parental structure and character is yet strong over offspring; and it should diminish in frequency with the augmenting independence of the individuals. The Cancer of infants should be the most numerous in the community; and the proportion of it should regularly lessen with advancing age.

The reverse of this expectation is the fact. Of 60,196 deaths from Cancer in England and Wales during the ten years 1851-60, not more than 559 occurred in the first five years of life; of which 178 took place in the first twelve months after birth. As this last number represents the largest mortality

from Cancer in any of these five years of life, it might seem that the influence of the parents contributed to this small excess of the Cancer of the newly born over that of young children generally. But there is doubt even as to this trifling fact ; since in 1855-6, the number of cases of Cancer in the first five years of life suddenly diminished, and the proportion of the disease is now actually less in the first than in any other year of life. From 1851 to 1855, the deaths from Cancer under 5 years of age were 361 ; whilst those in the next equal period were but 198. In the former half of the decade, the deaths during the first twelve months were 141 ; in the latter half, they were only 37.

I have characterised such a proportion of Cancer in early life as of trifling importance ; and, in view of the opinion that Cancer is derived by inheritance, it appears so. For even were there a preponderance of Cancer in early infancy above that of childhood generally, yet the great rarity of the disease, both then and in youth, is destructive to the theory of inheritance, when contrasted with its prevalence in later life. And, when it is remembered that the influence upon offspring is necessarily most strong and continuous on the part of that parent who is the most liable to Cancer, and is liable to it, moreover, pre-eminently in respect of her child-bearing faculty, the argument becomes increasingly forcible against the notion that any regular or effectual influence is exerted by either parent in subjecting the offspring to Cancer.

There are distressing cases, in which unborn infants are exposed, not to the supposed influence of predisposition only, but to that of actually existing Cancer of their mother—cases in which a woman having Cancer of the breast, is pregnant. Is the foetus born cancerous, or early infected with the disease? I believe this to be by no means usual. In one such instance, in which Dr. Protheroe Smith took my opinion as to the propriety of removing the breast, the infant was born puny, and soon died. But the cases are happily rare in which a woman already cancerous conceives. For every fatal case of Cancer in infants, six hundred women now die of that disease. Again, is it the youngest children of a mother soon to die of Cancer who become cancerous? I shall offer a negative reply to this question in a later part of my remarks.

Yet, notwithstanding these considerations, some kind of inheritance of the disease must be admitted. The early and the later statements I have made on the subject are alike facts; and they may, I conceive, be harmonised. Cancer of the uterus in three successive generations, Cancer of the left mamma in a mother and five of her daughters, Cancer of the breast both in the males and females of one family, these diseases are hereditary; and they are the more plainly so because of their likeness to various defects and peculiarities which pass from parents to offspring in corresponding organs. Sir Henry Holland has recorded many such cases; among which the absence of a patella in both father and son may be instanced,

I happen at the present moment to be attending a boy for congenital right inguinal hernia, whose father wears a truss for a similar protrusion on the right side. In tracing deformities to their source in inheritance, there is no thought of resorting, for the explanation, to a constitutional disease. The inherited peculiarity is clearly a local one. And it is equally so in the few cases in which Cancer is hereditary. Whatever its eventual progress when once established in the system (and it is not this, but only the condition of its origin, which is at present in question), the disease is initiated under a parental influence which dominates only in a part, and determines a local malady.

It may here, indeed, be suggested over again that Cancer presents a constitutional, equally with a local character, either of which apart or both together may have been transmitted from a parent. But after the examination of this question of its double nature in previous pages, it may now be a sufficient remark, that while there is no collision in the observed facts of the inheritance of Cancer with the theory of its local origin, no constitutional element is discernible in them which is consistent with their rarity and their singular limitations.

7. Enough, perhaps, has been already said upon the relation of Cancer to Tubercle. It is not altogether inconceivable that they are related; but not as cause and effect. The occasional though very rare occurrence of a subsidence of Cancer upon the outburst of pulmonary phthisis apparently establishes the fact of

a connection, though it be an antagonistic one, between them. Consumption, moreover, is in some few families a kind of alternative of Cancer, proving fatal to those members of the household who do not die of the latter disease. But, in the relation of cause and effect, it must be admitted that no definite connexion is made out between Tubercle and Cancer. There is little resemblance between the antecedent conditions of those who are liable to the two diseases. And it is likely that their somewhat frequent coincidence in the same persons, albeit at different periods of life, and in different organs of the body, is due to the fearful prevalence of phthisis in the community. If in one year 66,612 persons amongst us die of Tubercle in some of its forms, traces of once active Tubercle may be very frequently found in the bodies of those who survive it and die of other diseases. But these facts furnish no ground for supposing Cancer more than other diseases to be an offspring of Tubercle, but rather for regarding it as equally independent of them all, and as springing up with indifference to all known morbid conditions, whether of the body in general or of any of its organs.

Whilst the several arguments which I have thus contested afford no sufficient reason for the opinion that Cancer is originally constitutional, there are others tending to establish the opposite opinion, which I venture to think more consistent with facts. As the first three have been already referred to in the foregoing remarks, I need only enumerate them,

and may leave time for a longer attention to the last.

Cancer appears to me to arise as a local disease, independently of a constitutional or general cause :

1. Because of its invariable origin as a single tumour.

2. Because of the manifest dependence of the later tumours upon that first. This opinion is supported by the observed similarity of the morbid substance, in whatever organ or texture it may grow ; by the order regulating its dissemination ; by the interruption of the progress and dispersion of the disease, if the primary tumour be removed ; and by the possibility of extirpating that tumour by an early and adequately extensive operation.

3. Because of the remarkable manner in which it is inherited as a local, and not as a constitutional peculiarity—a disease of the corresponding organ of plural members of one family ; whilst at the same time any inheritance of the disease is uncommon, and that by infants extremely rare.

4. And, lastly, because of its preference of the healthiest persons. Upon this subject I shall venture to speak more at large.

If the conclusion be accepted, that Cancer is unconnected with any previous general malady, and is primarily a local disease, the search for its cause is much narrowed. We have to look for it in the prior conditions of the structures in which it originates, and in such personal characteristics as influence struc-

tural growth. The local occasion of Cancer may be changes induced from without during the course of life in a tissue once rightly formed, or it may reside in a yet anterior, that is an original, misconception of it.

As to the former of these conceivable causes, Cancer may certainly, in its least virulent and heterologous form, come on where there has been prolonged local irritation. But no amount of irritation is of itself sufficient to induce it, or Cancer would be excited in multitudes of places and conditions where it never comes, as by the lifelong annoyance of a corn. Some far more specific occasion is needed to induce a growth of Cancer. Thus, at various orifices within and without the body, at parts, as the navel and the recto-cutaneous septum, where embryonic growth comes latest to perfection, among organs, as the thymus gland, whose life ends before that of the rest of the frame, about chronic ulcers and fistulæ, characterised by long repetition of the same fruitless efforts at repair, even also in scars, Cancer originates; but it does so under conditions of cellular growth and decay, with which, in some few regions, but not in all, friction, injury, or traumatic irritation may combine, which they may possibly even intensify, but which they are incompetent to produce. In regard to the second presumed cause of Cancer, whilst the growth of the disease in moles and other defective parts of the integument, or in an undescended testis, declares plainly what exposure to disease results from original imperfection of structure, it is not possible

to draw from that occurrence the universal conclusion, that Cancer is a product of incompleteness or feebleness of primordial construction. There are many defects and deformities, involving various textures, and entailing on them a permanent feebleness, in which yet no outbreak of Cancer is ever known. This branch of the inquiry is in an unsatisfactory state, and is thus likely to continue, so long as we are without the means of observing organs previously to the development of Cancer in them, or are unable to discern the nature and the moment of the first textural change.

In a more general way, the prior condition of the persons exposed to Cancer allows of being ascertained ; and the results of my investigations appear to justify the following assertion with regard to it.

Cancer is eminently a disease of persons whose previous life has been healthy, and whose nutritive vigour gives them otherwise a prospect of long life.

The first ground for this statement is the assertion of the patients themselves. With remarkable uniformity they allege that they do not remember to have been laid up in their whole lives ; and that strength and vigorous feeling, excellence of appetite, digestion without discomfort, and habitual regularity and ease in the natural functions of the body, have been the prevailing and constant rule with them. The surprise which is manifested, and the descriptions of the patients, are sometimes very graphic. "She had a constitution that might have lived on till ninety ;" or, "There was never anything the matter

with me till this lump came." As the persons who form exceptions to this rule are not more than one in ten, and the previous ailments of those few are not uniform, the conclusion that Cancer is neither connected with nor dependent on a foregoing morbid condition is confirmed.

The appearance of a patient recently attacked with Cancer generally bears out this statement as to the previous healthiness of his life. I meet with none of the alleged cases in which cachexia can be deciphered in the countenance of persons recently attacked with Cancer. Often, indeed, the copious flooding which first betrays the existence of uterine Cancer produces pallor and emaciation in that class of patients; and a marked sallowness and emaciation are early symptoms when it is situated in the vegetative organs. Sometimes, also, the disease comes on in the spare and ill-fed, whose aspect is, of course, unhealthy, but not characteristic of Cancer. With these exceptions, which might, indeed, be anticipated, persons recently attacked with Cancer are, as a rule, well nourished and strong. Their wounds heal readily, and their various functions are well performed. The first onset of the disease is sometimes accompanied with even a general impulse of growth, and some *embon-point*, which may continue throughout the period in which the disease remains local, and occasionally persists to the end. Even medullary Cancer of the breast, in its first stages, generally produces little pain; and it may continue a year, and reach a considerable size, before inducing weakness or wasting.

It is important here to observe, that these statements have reference only to the previous condition of the patient, and to his state in the early period of the disease. It would be incorrect to allege that this healthy and vigorous habit prevails throughout the progress of the disease. On the contrary, after long infection of the system, this character is changed; and the patients, in the later stages of their illness, need much support and watchful care, from their proneness to succumb to moderate causes of exhaustion.

Should death happen from any cause in an early stage of the cancerous malady, all the structures of the body are found, as a rule, conspicuously healthy. The organ in which the disease originated is not perceptibly morbid at the parts not yet invaded. At a late period of the case, the secondary deposits are usually found in structures which are perfectly normal. Thus, when secondary tumours lie scattered throughout the liver, the intermediate tissue of that organ most commonly presents no sign of disease. It may, however, be congested or atrophied, fatty, or cirrhotic; or, together with the cancerous masses, there may be others quite distinct, which can be recognised as syphilitic. But there is no appreciable morbid character common to all the cases, to which the production of Cancer could be assigned. On the contrary, when, in the microscopic examination of a doubtful cancerous gland, I have lighted on a very minute nodule of Cancer, its abrupt outline and contrast with the absolutely nor-

mal and not even compressed glandular tissue next it were such as inevitably to suggest that it did not spring from or spread by means of any prior disease of the part itself, but was an independent and interjected matter. Whilst, therefore, the capacity to grow indifferently in natural and in altered structures subverts the notion that Cancer is the product of any one antecedent local disease, it is in no way inconsistent with the observation of its origin in persons who were theretofore generally healthy.

A healthy life in the period preceding the outbreak of the disease might further be looked for from the prevalence of longevity among the parents of Cancer-patients. Seventy and eighty are frequent figures in a list of the ages of those persons; and I accepted it as a fact, that her mother's mother had died very old, when a woman with Cancer of the breast told me that that ancestor of hers had reached the age of 109.

With the view of establishing or confuting this observation as to the previous healthiness of the persons who become the subjects of this disease, I have made inquiry into the comparative liability to Cancer of the different children of mothers. It appears from common observation that, with occasional exceptions, the earlier children of a family are the stronger and the longer lived. Conceived during the youth and vigour of their parents, they might be expected to possess the most robust health of any of the family; while the constitutional energy of the younger would progressively deteriorate with the in-

creasing age and much previous childbearing of the mother. Now, as Cancer-patients come of large families, the distinction, if any exist, between elder and younger children, would be conspicuously shown in their comparative liability to Cancer. Two sources of fallacy affect, though they do not vitiate, the conclusion from such an inquiry. One is, that younger children, being weaker, die earlier than elder; many of them succumbing in infancy, or early in mature life, to external causes of mortality. The proportion of elder children surviving to have a disease of declining life would thus be too large; and their numbers would further be swelled, with some unfairness to the comparison, by the occasional occurrence of Cancer in an only child. The exact result could only be obtained by comparing those elder and younger children together who should attain the same ages. But such an investigation would lead to no conclusion until every younger child had reached the age at which his elder brother or sister had manifested Cancer; and it could not be carried out at all without a prolonged and rare acquaintance with many families. The result of the inquiry is, therefore, to be taken with this reserve, that it is not strictly a comparison of the elder and all the younger children of each family, but an arrangement of the patients I happened to find suffering from Cancer according to their place in the family of their mothers. The value of the result is, however, not materially, if at all, affected by this mode of conducting the inquiry, since it is supported by the two

collateral facts, that these particular patients had lived to an age at which they could become the subjects of Cancer, and that their previous lives had been eminently healthy. The result may even be regarded as a sufficient approximation to the truth for the purpose in hand, on the sole ground that, taking the community at large, we are sure at all times to find many more younger than elder children alive ; while juniors, as a rule, and especially in the prolific families in which Cancer occurs, are far in numerical excess of the single eldest born.

With the kind aid of my colleagues at the Middlesex Hospital, and of a few medical friends in different towns, I have ascertained the place of 101 Cancer-patients among the children of their mothers. The result of the inquiry shows that, while no position in the family exempts a child from Cancer, yet there is a decidedly greater liability to the disease among the elder. One patient was the twenty-first child of her mother ; and three, as it happened, were thirteenth children ; but more than half the cases of Cancer occurred among the first three of the children, more than one-third in the eldest two, and more than a quarter of them in the first-born. If the number of only children in these families be excluded, the proportion of Cancer among the first-born is still in excess of that in any younger member of a family. I have added to the table a list of the families among whom most of the cases in the table occurred, arranging them according to the numbers of children in each family.

Table showing the place of 101 persons affected with Cancer in the family of their mothers.*

Eldest children	26	Seventh	5
Second.....	11	Eighth.....	3
Third	19	Ninth	2
Fourth.....	13	Eleventh.....	1
Fifth	9	Thirteenth	3
Sixth	8	Twenty-first	1

An arrangement of the families, among whom 89 of the foregoing cases of Cancer occurred, according to the whole number of the mothers' children.

Families consisting of		Families consisting of	
An only child.....	5	Ten	4
Two children	6	Eleven.....	5
Three	5	Twelve.....	4
Four.....	3	Thirteen	4
Five	10	Fourteen.....	2
Six	9	Fifteen	1
Seven	9	Sixteen	2
Eight	7	Seventeen	1
Nine.....	8	Twenty-one	1

Although this result is such as to confirm the opinion which it was designed to test, yet I cannot pretend that it conclusively establishes the superior healthiness of those who become cancerous. The numbers are too small to be convincing. I offer it for consideration and further trial; and also because the inquiry is one which can be pursued to advantage by the several members of an Association like this, united for scientific purposes.

* This table includes cases of Cancer occurring in more than one member of a family.

5
12
15
12
50
54
63
56
72
40
55
58
52
28
15
32
17
21
647

Trustworthy results could be secured in so plain an investigation; and they might be accumulated in such measure as to confute or to establish an additional fact, which appears in my small figures, but which I have not ventured to assert—viz., that the proportion of first-born who have Cancer is greatest where the conditions of health are worst. Certainly I have found more Cancer among eldest children in my inquiries in London, than my friends who have supplied me with information from the country.

An examination into the distribution of Cancer in the community leads to results which bear upon the general state of the persons who are particularly liable to this malady. Such an inquiry offers much interest and much promise; for not only has Cancer existed in all time, so far as surgical records extend, but it is also every where to be found. Now, if a disease common to all the human race is yet unequally distributed, some cause influencing its prevalence or its rarity might be disclosed by an examination of the circumstances.

In the earlier part of this paper I have referred to families in which Cancer constitutes the disease of a majority of the individuals: there are other families in which it has been never known to occur. Is it possible to detect any differences in such families upon which this exemption from Cancer, and the prevalence of it, respectively depend?

This inquiry needs peculiar opportunities for being fairly and exhaustively conducted. Only now and then could it happen even to a discerning and trusted

family practitioner, that he should be at liberty to impart from his experience one contribution to such an investigation. I can myself do little more than indicate the direction it might take. The solution of it, as of too many other important questions, must await the accumulation of sufficient facts.

On the one hand, one old family, in which the occurrence of Cancer is doubtful, and another, of which I happen to have private cognisance, in which it is unknown, are distinguished by the absence of Phthisis, Syphilis, and disease of the lungs, kidneys, and liver; by moderate longevity (up to the ninth decade) amongst the elder born; by deaths from diseases of the circulating system; and by an ample supply of good air and other external conditions which tend to invigorate the body and mind.

On the other hand, the history, procured by Mr. Sibley, of the remarkable family well known at the Middlesex Hospital, in which the mother and five of her daughters suffered from Cancer of the left breast, comprises residence, I believe, in London, longevity on the father's side, and Phthisis on the mother's, and possibly on both sides. It is evident that this information offers no distinct clue to the generation of Cancer in the one house, and its absence in the other.

But, failing this narrow inquiry, can we find in the distribution of Cancer among large masses of people, any rule which would connect its rarity or frequency with the general conditions of their life?

It is impossible to institute a comparison between

different nations in respect to their liability to Cancer. The knowledge of disease in other countries than our own, and the sources of governmental returns, even where these are rendered, are not satisfactory. I do not in this refer to the United States of America. They possess public records of mortality, but I have not yet had access to them.

Again, in our own country, there is no method of determining the prevalence of a disease, but by the Registrar-General's record of the deaths which may be due to it. As, however, in the instance of a malady so fatal as Cancer, the death-rate only too accurately represents its numerical prevalence among the people, the Government returns are suitable for the inquiry before us.

The various facts to which I have to refer are contained in the following tables.

*Table showing the Annual Mortality from Cancer in
England and Wales from 1850 to 1862.*

1850	4966	1857	6201
1851	5218	1858	6433
1852	5477	1859	6676
1853	5663	1860	6827
1854	5826	1861	7276
1855	6016	1862	7396
1856	5859		

This table exhibits an almost regular increase in the number of yearly deaths from Cancer. There is too much uniformity in the variation of the figures for the progression they represent to be due to error only, or to a better recognition of the disease in the

later years. Were the returns thus worthless, they would, in all probability, be very unequal; but they do, in fact, show an annual increase of about 200 in the mortality from Cancer throughout the country. If the fact be further investigated, it will be found that the increase is shared with considerable exactness by the deaths of both males and females, and also among the mortuary returns from all the eleven Divisions of the country. The exceptional instance of the year 1856 furnishes a remarkable confirmation of the general correctness of the returns. In that year the mortality did not increase, but fell short of that of the previous year, and the usual increase of 200 deaths was postponed till the following year. On examining in detail the returns for 1856, the depression of the numbers below those of the previous year is not abrupt and confined to only a few localities; for a lessened increase of the deaths from Cancer is found in ten of the eleven Divisions, and an actual diminution of the numbers is common to eight of them. Five years afterwards, in 1861, the usual annual increase by 200 was more than doubled. This great increase, again, was not a result of local error; but was shared by ten out of the eleven Divisions, and the lowest share among seven of them was 37.

This general fact, that Cancer increases amongst us, is not to be explained by the simultaneous advance of the population. The disease has an increment of 2000, or about two-fifths, in ten years; the people multiply by one-tenth only, or about 2,000,000, in the same period. Unless, therefore, mere fecundity

produce the disease (a notion which throws very far back the cause to which it may be due), it follows that there must be some considerable change in the general condition of the people. This change, to be effective in producing Cancer, must have acted, not during the recording of the cases, which did not happen until after the death ; but must have been in operation before they occurred. Now, the only great changes in the general condition of the people, preceding by a few years this increase of the disease, are those which result from accumulated wealth and sanitary improvements. Cancer has augmented with the well-being of the nation. A disease characteristic of the healthy may be expected to abound amid conditions of health ; and thus, from our present point of inquiry, Cancer may be ascribed to corn-laws and good living, to the discoveries of gold, to the good government which has reared to adult life and to old age a larger proportion than heretofore of the entire population.

A yet more instructive fact appears in the next table, which shows the relative proportion of Cancer in separate parts of our country. It is notorious, that very different states of general healthiness exist in large divisions of the community. If it be true that Cancer bears some relation to the healthiness of a people, the fact should be discernible on comparing unlike parts of England together. Is the distribution of Cancer equal among equal numbers of the population ; and to what differences may the varying proportion of the disease, if it do vary, be traced ?

Table showing the Proportion of the Population, and of the Total Mortality, in which One Death from Cancer occurred in England and Wales, and in the Eleven Divisions, during the Year 1851, and also during 1861.

	1851.		1851.	
	One Cancer-death to Population.		One to total Mortality.	
	Male.	Female.	Male.	Female.
England and Wales } (or average Cancer mortality)	5846.....	2461.....	133.....	52
London	4884.....	1778.....	113.....	38
South-Eastern Div.	5362.....	2206.....	105.....	41
South Midland.....	4304.....	2163.....	87.....	42
Eastern	7226.....	2131.....	150.....	42
South-Western.....	4921.....	2343.....	103.....	45
West Midland	7478.....	2479.....	177.....	55
North Midland.....	6417.....	2692.....	131.....	54
North-Western.....	7946.....	3263.....	214.....	80
York	5881.....	2869.....	141.....	65
Northern	5454.....	2970.....	119.....	60
Wales	7166.....	3833.....	149.....	74

1861.

England and Wales } (or average Cancer mortality)	4484.....	2019.....	101.....	41
London	3758.....	1553.....	95.....	34
South-Eastern Div.	4419.....	1697.....	86.....	30
South Midland.....	3520.....	2141.....	72.....	41
Eastern	4553.....	1713.....	98.....	34
South-Western.....	4309.....	1920.....	85.....	34
West Midland	5057.....	2175.....	109.....	42
North Midland.....	4499.....	2329.....	96.....	47
North Western.....	6249.....	2454.....	166.....	59
York	4634.....	2068.....	110.....	45
Northern	3983.....	2258.....	92.....	49
Wales	4282.....	2962.....	92.....	59

In making this inquiry, I have ascertained the proportion in which the disease pervades the several populations, and have given that number in which one case of Cancer occurs. To avoid the necessity of correcting the numbers, I have selected the years 1851 and 1861, in which the census was taken. I have added a comparison of the deaths from Cancer with the total mortality; and, as the facts relating to the two sexes materially differ, I have made the calculations for them separately.

The table may be read thus. In the South-Eastern Division, 1 out of 5362 of the male population died of Cancer in 1851; while of the male population in 1861, 1 in 4419 died of Cancer. Or, thus: in 1861, one of every 30 deaths of females in the South-Eastern Division was due to Cancer; while the deaths of females from Cancer in the North-Western Division were about half as many, or 1 in 59 of the total female mortality. Any of the numbers may be compared with that corresponding to it in the first row, which represents the average Cancer mortality, or that of the whole of England and Wales.

It thus appears, that there is a most marked difference, not only (as I have already stated) in the prevalence of Cancer in the two years, but also in the relative number of deaths which are due to it in different parts of England and Wales. If the country be divided by a line from Bristol to Peterborough (between South-Western and West Midland in the Table), the mortality from Cancer in the five southern divisions is considerably in excess of that on

the north of the line. Its greatest prevalence, according to the records, is in London and the counties south of it; the least is in Lancashire, which constitutes, with Cheshire, the North-Western Division, and in Wales. And this diminution is almost regularly progressive from the South-Eastern to the North-Western regions, and uniform across the whole breadth of the island.

The conclusion is nearly identical with this, if the distribution of Cancer be examined on a yet larger scale; if the inquiry be extended over a longer period of years, and at the same time it be limited to the sex which supplies the large majority of cases, and to the age of its greatest abundance.

Table showing the Proportion of the Female Population, between the ages of 35 and 64, among whom one death occurred from Cancer in the ten years 1851-60, and also the Proportion in which one of all the deaths of Women between the same ages was due to that disease.

	1851-60.	
	One death from Cancer in female population, between ages of 35 and 64.	One death from Cancer in total female mortality between ages of 35 and 64.
England and Wales		
(average)	91	15
London.....	67	12
South-Eastern Div....	83	12
South-Midland	89	13
Eastern	84	12
South-Western.....	100	14
West-Midland	90	14
North-Midland	97	14
North-Western	103	20
York	100	16
Northern	102	16
Wales	137	20

This examination of the question, more limited as to persons and ages than the former, but more extended as to time, strikingly confirms the result of the first investigation. In this, as in the former Table, Cancer is found most abundant in and about London, and especially in the South-Eastern Division, whilst it is least so in the North-West and in Wales. The line from Bristol to Peterborough separates women of the given age, nearly as it does the entire population, in their proneness to Cancer. And the distinction is yet more clearly drawn by the proportion in which Cancer and other diseases are fatal to them at the same age; for the line of this average strikes so far North as to part off the four Northern Divisions only, which numerically balance all the rest by the less liability of their women to Cancer. However it be accounted for, the comparative exemption of the North-Western Division and of Wales is manifest.

Contrasts so great as these appear to open a prospect of distinguishing conditions of people as determining a greater prevalence of the disease. I do not, however, pretend to explain the reasons of them all. The capital city comprises populations in very unequal conditions of life, and no ready explanation offers of its high mortality from Cancer. Possibly the healthiness of Londoners may be above that expressed in the rate of mortality; and it is certain both that fewer deaths from Cancer would be omitted from a London than from any extra-metropolitan registry, and that the natural mortality from

that disease in the capital is exaggerated by the immigration of many advanced and hopeless cases which originated elsewhere. The contrast between London and Wales is more difficult of explanation. The death rate, our only present means of testing healthiness, is but little higher in the city than in the principality; yet Wales is at one end of the list, the most exempt from Cancer, London is at the other end.

I may not stay to discuss the trustworthiness of the several figures from which these results have been obtained; those, namely, representing the population, the total mortality, and the special mortality from Cancer. I have examined them with reference to the proportion they bear to one another in parts where children and young people abound, as well as in the two sexes, and also with regard to a prominent mortality of particular Divisions. I have also made some comparisons of the Divisions as to their liability to Cancer at all ages, and in respect to the proportion in which the causes of death are uncertified; and the general result is the same—a diminution of Cancer from South-East to North-West. Fallacies, indeed, there may be, and doubtless are; but if these are to be regarded as fatal to the use of the Registrar-General's figures in a disease so well marked as Cancer, they would show the figures to be not worth the trouble of collecting. These are, I am persuaded, far more accurate than a cursory examination of them would suggest; and I am the more disposed to trust the conclusions to

which they lead, because the distinctions they bring out between the Divisions in respect to proneness to Cancer, are not minute and doubtful, but are most striking by their largeness and extent.

It will be convenient to select for comparison the South-Eastern and the North-Western Divisions; for, as the difference between them, in respect to their liability to Cancer, is almost extreme, so also is there a prominent distinction between the people of the South-East and the North-West. The prevalence of Cancer is greatest in the South-East at every period of life; and I think it of importance to add a Table, for the purpose of showing the actual contrast between the two Divisions, and its permanence throughout the whole of life. (*Page 47.*)

If there be any general difference in the populations of the two Divisions to which this marked dissimilarity in their diseases may be due, it sufficiently appears in their general aspect, in the nature of their occupations, in the mortuary returns of the two Divisions. It may be summed up, for our present purpose, in a difference of their general health. From this cause more than any other, it probably happens that but one in six of the entire population survives the age of forty-five in the North-Western Division, while in the South-Eastern the proportion is so high as one in five. Longevity is absolutely greater in the South-East, though its population numbers a million less than that of Lancashire and Cheshire; for it possesses nearly the same number of persons alive from sixty-

Table showing the Proportion of One Death from Cancer in the Mean Population, and in the Total Mortality of the South-Eastern and North-Western Divisions, at the same ages, 1851-60.

	All ages or Average	Under 5.	5—25.	25—	35—	45—	55—	65—	75—	85—
SOUTH-EASTERN DIVISION.										
In Population.....	285	4173	5461	1027	240	109	71	48	41	39
In Total Mortality	55	2120	372	102	28	16	18	27	54	117
NORTH-WESTERN DIVISION.										
In Population.....	402	5740	7700	1195	297	125	75	56	58	57
In Total Mortality	102	5043	2652	128	42	26	27	42	86	175

five to seventy-five, and five thousand more than the North-West above that age. Were this difference due solely to the removal of adults from Lancashire by emigration, its healthiness might still not be called in question, and the liability of the two divisions to Cancer might be alike ; but, in the foregoing investigation, the Cancer-mortality has been regarded, not in its absolute numbers, but in its proportion to the population and to the total mortality respectively. The tendency to Cancer is thus by every proof shown to be less in the North-West.

I have added one more table (it might have been extended to more than six hundred districts), which exhibits the very different proportions in which the people of a few of our towns are affected with Cancer. One death from that disease occurred during ten years in the number of the population which is set after the name of each town. There are here, again, some striking contrasts in the figures, even between towns which appear to be very like one another. I have verified the facts in some instances by personal inquiry ; but I forbear to comment on them, as I have not the local knowledge which might enable me to suggest an explanation of the differences.

London	237
East London	342
West London	80
St. George's, Hanover Square.....	156
Birmingham	288
Mansfield.....	460
Manchester	302
Liverpool.....	337
Wolverhampton.....	362

Warwick	270
Norwich	210
Great Yarmouth	194
Scilly Isles	133
Anglesea	469
Penzance.....	435
Bristol	193
Clifton	319
Uxbridge	318
Reading	156
Kingsclere	414
Newbury	275

The general conclusion to which I am led by the foregoing considerations is that Cancer has no dependence on any malady anterior to the appearance of the first tumour, but that it originates in persons otherwise healthy and strong. If this conclusion is inconsistent with prevailing opinions as to the cause and nature of the disease, the collision of the facts proves the need for more satisfactory evidence on behalf of those opinions than is at present in our possession. The existence of an antecedent general malady is, as far as I can perceive, pure conjecture, being entirely destitute of proof, or even of reasonable support. The idea sprang up in error; and it has been perpetuated mainly by the erroneous conclusions drawn from repeated want of success in surgical operations.

It is not necessary, and may not indeed be advantageous, to suggest any explanation of the possible influence of prior healthiness upon the production of

Cancer. A theory which should attempt to account for the growth of disease out of health must, from the nature of the case, render the acceptance of the fact itself precarious. I am emboldened, nevertheless, to offer my own opinion as to the ultimate occasion of the disease, because, being formed independently, and from an altogether different view of the subject, it coincides to some extent with the conclusions of certain other observers. It is thus partly in accord with the opinion of Mr. Simon, that Cancer is a new organ, and partly with that of Mr. Hutchinson, who graphically ascribes the outbreak of Cancer to a mutiny and ineffective regulation of some, it may be even a very few, of the cells.

It appears to me that persons of unusual vigour possess in their textures a capability of action beyond that which suffices, and is usually employed, for their perfect construction. Growth naturally stops at the point which best suits the destiny of the organ, and the demand of the remainder of the system upon that organ. An excessive demand on a completed structure leads to hypertrophy or over secretion, as the case may be. But this capability I think of is not one issuing in hypertrophy, but in a new formation. It is the reproductive faculty of tissue, as distinguished from that of the species; and the new growth resulting from it is equivalent in nature to that which prepares the lung or the tooth in the embryo, not because of any present demand for its use, but in readiness for service yet future. Whilst equivalent in nature to new embryonic formations, and

*but cancer depends not upon
constitutional disease but upon
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thereby distinguished from hypertrophy, it begins and proceeds without adequate control. Just as there is no use in the adult frame for superfluous growth, for any parts beyond those which constituted the original and total body, so there is no power in it to model an untimely bud into a new organ. And neither is there a genial directing maternal influence; for the individual, severed and already grown, has virtually no longer a parent.

There is, I conceive, such an active formative control by the mother over the young she carries, corresponding in body to that which she afterwards exercises over mind. I think I even recognise a converse influence of the foetus upon the mother, and am prepared, therefore, to find the power to grow, which is of the life of the embryo, modified by the power to control and direct, which is maternal. It is true that the foetus is as isolated as it possibly could be; suspended in liquid, connected with its mother only by a nerveless funis, not continuous, even at the attachment of the placenta, and distinct in its very blood current; yet there is connection enough to impress figure, and feature, and every external stamp of lineage, upon the child; and it is presumable that the regulating influence reaches to the internal organs, even to their first development and their place, no less than to their minuter construction.

According to this view, the period of uterine life constitutes the spring time of existence. Then only are new organs produced. When a bud is put forth in after life, in its summer, or autumn, or winter, it

is without the order, the slowness and definiteness of growth, and the compact isolation of a normal organ. It manifests an uncommon survival of embryonic power in the person in whom it sprouts, a residual vernal energy, potential spring; yet, for want of the control of a modelling power, its growth is excessive, and its final construction, at the same time, stops short of the perfectness of the rest of the adult body.

It accords with this theory, that Cancer is almost peculiar to organs during the wane of their functional activity. When special nervous sensitiveness is over, when the variations of the vascular system are out of correspondence with the local nutrition, when tissue metamorphosis is at a minimum, and the part is reduced from its capability and energy as an organ to something less than even a tissue securing its own maintenance (for it may be actually shrinking), then any disproportionate activity, any renewed impulse of growth, in a single microscopic structure, would be not only beyond the control of the rest of such an organ, but in excess of its ability to resist encroachment. Of such renewed activity of life may Cancer be the product; for it is but an undirected and unrestrained heaping together of materials in their earliest form of development. Its value to the organ it springs from is less than *nil*, since with superior vitality it supersedes the waning or extinct forces of its site, which it destroys in place of renewing. Its subsequent general influence in the body is as pernicious, as that of oxygen, which it resembles in its diffusibleness, is good.

There is one conclusion from the facts brought forward in this paper, which, though collateral only, and not contemplated at the institution of the inquiry, is yet of too great importance to pass unnoticed. I allude to the valuable argument furnished by them for early operations in Cancer, and an argument which corresponds with their comparative success. Whilst yet the first tumour has undergone little diffusion, there is hope of a complete extirpation of the disease—a hope which quickly fades away as the tumour grows. I know nothing more distressing in practice than to meet a patient, who has carefully concealed this disease till she could bear it no longer, with a refusal to operate on it at all; yet this is the too frequent result of delay on the part of patients in consulting a Surgeon, and of early uncertainty as to the nature and probable progress of the disease. The conclusion at which I have arrived may possibly be of some advantage, if it only remove from the minds of patients the dread of discredit which too many suppose to attach to having Cancer; for, in fact, the power of generating the disease is rather a proof of a strong than of a tainted constitution; and, on the whole, its appearance in one member of a family is likely to prove the exemption of all the rest. Any pain connected with the avowal may thus be mitigated, and the fullest advantage of treatment may be gained by an earlier recourse to medical aid.

